by James Brodrick

The impact of the first L Prize extends well beyond Philips and the consumers who will be buying the new product next year: Competitions drive innovation, and innovation drives market competition

The U.S. Department of Energy launched the L Prize competition in 2008 to spur manufacturers to develop high-quality, high-efficiency solid-state lighting (SSL) products to replace the common light bulb. To make sure consumers had viable options when it came to replacement bulbs, we set the L Prize bar extremely high—not only for energy efficiency, but also for output, color appearance, color rendering and lifetime—knowing that anything less would not achieve significant impact in the lighting market. The L Prize put the focus on light quality to encourage and reward products that could do it all in an A19-size package.

THE FIRST WINNER

This past August, the L Prize competition announced its first winner—an LED 60-W replacement bulb from Philips Lighting North America. That announcement was the culmination of 18 months of intensive field, lab and product testing to verify that the Philips entry met the competition's stringent requirements. The requirements ensure not only that the winning product performs at a high level, but also that it's suited to mass production for a competitive commercial market.

Over the course of its 18-month trial by fire, the winning product excelled at each of the paces it was put through. These included industry-standard photometric testing carried out by independent laboratories, long-term lumen maintenance testing at Pacific Northwest National Laboratory under elevated temperature (45 deg C) conditions, as well as field assessments conducted with utilities and other partners, and a series of stress tests that subjected product samples to high and low temperatures, humidity, vibration and other extreme conditions.

In all of these areas, the Philips entry exceeded the L Prize requirements. The 910 lumens it produces are more than the light output of a typical 60-W incandescent bulb, yet it consumes less than 10 watts, for an energy savings of 83 percent—and with a correlated color temperature of 2,727K and a Color Rendering Index of 93. DOE estimates that converting every 60-W bulb currently in use to the L Prize winner would save approximately 35 terawatt-hours of electricity in one year—enough to power the lights of nearly 18 million households. That translates into a savings of almost $4 billion a year for consumers, as well as the avoidance of 20 million metric tons of carbon emissions.

As the L Prize winner, Philips received a cash prize of $10 million, which it plans to invest in the production and marketing of the winning lamp here in the U.S. Philips expects the winning product to be on store shelves in early 2012, and has already incorporated technology developed for the winning entry into products that are now in stores. Philips is working with retailers, distributors, and more than 30 utility and energy efficiency program partners to implement coordinated promotional efforts, programs and incentives for the L Prize winner. These efforts are intended to bring prices down quickly, addressing the high development costs and low initial sales volumes that make new technologies expensive.

A CATALYZING IMPACT

The impact of the first L Prize extends well beyond Philips and the consumers

The Philips L Prize winning product was the culmination of 18 months of testing.

who will be buying the new product next year. Most of the LED replacement lamps on the market in 2008 fell far short of 60-W incandescent bulbs in terms of key performance parameters and thus were likely to disappoint consumers. The LED lamps tested through DOE's CALiPER program back then were only equivalent to 10-W to 25-W incandescent bulbs in terms of the light they produced. However, since 2008, there's been a steady improvement in LED replacement lamps, influenced at least in part by the high performance targets established by the L Prize competition.

Competitions drive innovation, and innovation drives market competition. The launch of the competition itself followed by the submission of the Philips entry in 2009 have helped catalyze market competition and move the LED lighting industry as a whole farther along the route toward high-quality replacement lamps for incandescent bulbs. The availability of the winning L Prize product in retail outlets will help raise consumer and industry expectations about the efficiency and performance of LED lighting products in general.

The number of LED replacement bulbs already on the market is growing all the time, and there have been notable improvements in their quality. For example, a review conducted in September 2011 of 117 LED replacement products listed by DOE's Lighting Facts program found that although most of them produced between 200 and 600 lumens—equivalent to 25-W to 40-W incandescent lamps—a few emitted more than 800 lumens (equivalent to a 60-W incandescent lamp), and an even smaller number emitted 1,100 lumens (equivalent to a 75-W incandescent lamp), which was a significant jump from the products on the market just six months earlier. And while the efficacy of those 117 products varied considerably, most of them fell between 35 and 80 lumens per watt—again, indicative of a significant upward trend.

Although Philips made history as the first L Prize winner, the idea behind the competition is that a rising tide lifts all boats. And that, in effect, makes lighting users the real winners. For more information about the L Prize competition and the winning entry, visit *www.lightingprize.org.*

James Brodrick is the lighting program manager for the U.S. Department of Energy, Building Technologies Program.